From: Sanchez, Carlos
Sent: Friday, March 14, 2014 10:21 AM
To: Crumbling, Deana; Tzhone, Stephen; Rauscher, Jon; Khoury, Ghassan; Huling, Scott; Berg, Marlene; Moran, Gloria; Andrews, Lawrence; kdbecher@usgs.gov
Cc: Villarreal, Chris; Meyer, John; Powell, Dan
Subject: RE: Arkwood - sit visits notes--clarification

Deana,
Those are great recommendation and I agree that we need conduct a statistical sampling design.
There are two different areas for the site. There is the area that was capped and an area where a soil cover (about 6 inches) was placed (I assume the soil cover was added for slopping and drainage).
So this should be considered when the sampling is designed. CAS

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From: Crumbling, Deana
Sent: Friday, March 14, 2014 7:55 AM
To: Tzhone, Stephen; Rauscher, Jon; Khoury, Ghassan; Huling, Scott; Berg, Marlene; Moran, Gloria; Andrews, Lawrence; kdbecher@usgs.gov
Cc: Sanchez, Carlos; Villarreal, Chris; Meyer, John; Powell, Dan
Subject: RE: Arkwood - sit visits notes--clarification

Hi Arkwood Team,

In the document Arkwood Site Visits.docx (16 KB), the following was stated:
"Deana Crumbling (EPA sampling protocol expert), after seeing the site and the extent of the cap, suggested it may be appropriate to divide the cap into sections and randomly select one section for testing (following her protocol) and then apply the results to the entire capped area."

This is a mischaracterization of what I proposed, which was that the capped area be considered a single population (i.e., a single decision unit, DU) that could be sampled statistically. If a statistical sampling design is chosen, the capped area DU would be divided into sampling units (SUs) of a fairly constant size, probably either ¼-acre, 1/3-acre, or ½-acre units. The choice of sampling unit area is a matter for further discussion and is partly dependent on the exact acreage of the capped area.

Then a "statistical sample" would be drawn from the DU's component SUs. Drawing a "statistical sample" would involve randomly selecting a number of DU (most likely a number between 5 and 10, inclusive, with the exact number a matter for further discussion and partly dependent on the size and number of the SUs). Each SU selected for sampling would get 1 incremental sample of 30 increments. At least 1 of the SUs would get triplicate incremental samples (i.e., 3, rather than 1, incremental samples from that SU) as a QC measure to evaluate the variability within SUs.

The statistics for the SU incremental sample results (mean, standard deviation, UCL) would be calculated. The UCL is the upper bound for the estimation of the population mean (i.e., the estimate of the mean applied to the entire DU).

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There are also alternative sampling strategies that could be considered. For example, the capped area DU could be split into 1-acre SUs, all of which get sampled, and sampled using more increments (~50 increments) to maintain a reasonable spatial increment density. If all those SUs are sampled, then entire DU area will have been sampled. One of the SUs would still need to be sampled with triplicate incremental samples as a QC check on field heterogeneity.

SPECIAL LAB PROCEDURES REQUIRED: No matter what form the field sampling design takes, special sample handling and subsampling procedures must be performed to ensure the representativeness of the analytical sample. There are laboratories capable of correctly performing these procedures and the subsequent dioxin analysis. There is an extra charge for incremental sample handling, which currently is $100 or less, depending on the particular laboratory. Alternatively, it is possible under favorable conditions (dry weather, cooperative soil) to perform the sample handling and subsampling in the field, and send to the lab only the 15-grams of soil that will be the lab's analytical sample. That saves on lab costs, and allows a wider selection of dioxin laboratories to perform the analyses.

One of the incremental samples that is part of the triplicate set will be subsampled in triplicate as a QC check on the efficiency of sample processing. The results from the 2-level replication QC are used to calculate the field heterogeneity and subsampling variability. The lab's control samples (LCSs) are used to calculate analytical variability.

So to determine the number of dioxin analyses for the capped area: assume that 8 SUs are sampled. One of the SUs gets triplicate incremental samples (+2 analyses), and 1 incremental sample gets triplicate subsamples (+2). That is a total of 12 dioxin analyses for the capped area. No additional "lab duplicates" or "field duplicates" are required for only 8 SUs that are from what is expected to be a homogeneous population. Assuming the capped area's concentration results are low, are not highly variable, and the QC checks demonstrate adequate precision, then the DU mean can be determined with high confidence, and no additional sampling of the capped area should be required to characterize the current cap.

Also, EPA's dioxin TEQ Calculator is publicly available from EPA's Dioxin Toolbox website. It can be used to calculate and document Dioxin TEQs, especially since some non-detect congeners are expected to be present.

Hope this helps clarify things for now,
--Deana

Deana Crumbling, M.S.
Environmental Scientist | Cleanup Technology Innovation Program
Office of Superfund Remediation & Technology Innovation

Pollinators are not optional

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Phone: 703-603-0643 | Fax: 703-603-9135
Email: crumbling.deana@epa.gov

Clean-Up Information Webpage: http://cluin.org

Triad Resource Center: http://www.triadcentral.org

Note EPA email accounts will no longer send/receive messages >25MB.

From: Tzhone, Stephen
Sent: Thursday, March 13, 2014 2:58 PM
To: Rauscher, Jon; Khoury, Ghassan; Huling, Scott; Berg, Marlene; Crumbling, Deana; Moran, Gloria; Andrews, Lawrence; kdbecher@usgs.gov
Cc: Sanchez, Carlos; Villarreal, Chris; Meyer, John
Subject: FW: Arkwood - sit visits recap, path forward

Hi Arkwood Team,

Let me know if you have any comments or questions on the site visits summary/path forward (see Arkwood Site Visits.docx).

Thanks,

Stephen L. Tzhone
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214.665.8409
tzhone.stephen@epa.gov

From: Mescher, Jean A [mailto:Jean.Mescher@McKesson.com]
Sent: Thursday, March 13, 2014 9:15 AM
To: Tzhone, Stephen; 'MOIX@adeq.state.ar.us'
Subject: Arkwood - sit visits recap

Stephen and Mark,

Once again, I think that the site visits were productive and helpful in providing a better understanding of the Arkwood site. Please see attached summary of the recent site visits to Arkwood and the associated attachments. As indicated in the summary, we will submit a revised CSM and proposed sampling plan by April 30, 2014. Please contact me if you have any questions or comments on the summary.

Jean